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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L STREET NW
WASHINGTON, DC 20037-1526

EXAMINER	
KALAFUT, STEPHEN J	

ART UNIT	PAPER NUMBER
1745	5

DATE MAILED: 10/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/068,837	HIGASHIYAMA ET AL.	
	Examiner	Art Unit	
	Stephen J. Kalafut	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2 and 4* is/are allowed.

6)☒ Claim(s) *1 and 5-19* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Claims 5-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 5 is unclear because it recites "set values", but not the parameter for which the value is set. The specification discloses positions in a valve corresponding to reactant flow rates. In line 9 of claim 6, "the supply system" has two possible antecedents, either for the air, oxygen or oxidant; or for the "at least one type of material". Which of the two is intended is unclear. Claims 7-19 depend from claims 5 or 6, and would likewise be indefinite.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 9-11, 16 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamaoka *et al.* (US 6,613,465).

Yamaoka *et al.* disclose a fuel cell (1), which produces electric power using hydrogen, and which may be of the solid polymer electrolyte type (column 5, lines 20-25). The hydrogen is supplied by a reformer (4), which would correspond to the present "reaction part", and in which both steam reforming (column 4, lines 54-60) and partial oxidation reforming (column 5, lines 5-10) occur. The hydrogen may be produced at two different set values corresponding to two different raw fuel input flow rates (figure 6). The temperature within the reformer is maintained

substantially constant, and thus within a temperature range, by balancing the two reformation reactions (column 5, lines 1-4). Since air is sent into the reformer by a pump (13), this balancing would be done by controlling the amount thereof. Thus, the flow of air (which contains oxygen and is thus an oxidant) is varied and controlled to maintain the reaction part within a narrow range of temperature. The raw fuel, or "at least one type of material", is a liquid mixture of methanol and water (column 4, lines 49-50), which would be a solution.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaoka *et al.* in view of Fronk (US 2002/0048698).

This claim differs from Yamaoka *et al.* by reciting methane as a raw material for the "reaction part". Fronk discloses hydrocarbons of the formula C_nH_{2n+2} as suitable raw fuels for a fuel cell system with a reformer, the simplest of these being methane (n=1), and as alternatives to methanol (section 0022). For this reason, and since the use of a gaseous hydrocarbon would reduce the heating demand of the evaporator (7) disclosed by Yamoka *et al.*, it would be obvious to use the hydrocarbons such as methane disclosed by Fronk as the raw hydrocarbon fuel in the fuel cell system of Yamaoka *et al.*

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaoka *et al.* in view of Edlund *et al.* (US 6,383,670).

This claim differs from Yamaoka *et al.* by reciting a hydrogen storage means at the outlet of the hydrogen-producing device. Edlund *et al.* disclose a fuel cell system which includes a hydrogen producing device (16) including an outlet (54) and a hydrogen storage device (56). Because this would allow some of the hydrogen to be used elsewhere when the load demand on the fuel cell is low, it would be obvious to use a hydrogen storage device as shown by Edlund *et al.* in the fuel cell system of Yamaoka *et al.*

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaoka *et al.* in view of Yamamoto *et al.* (US 6,420,060).

This claim differs from Yamaoka *et al.* by reciting the use of exhaust heat from the fuel cell, via the coolant, as hot water. Yamamoto *et al.* disclose a fuel cell (1) with a coolant loop (5) through which fuel cell heat is exhausted, and then used to produce hot water (column 3, lines 28-57). Because this would provide a use for heat which might otherwise be waster, it would be obvious to use a coolant loop and hot water heating device as disclosed by Yamamoto *et al.* with the fuel cell of Yamaoka *et al.*

Claim 3 is objected to because of the following informalities: The term "on/of" in line 6 of this claim should be "on/off". Appropriate correction is required.

Claims 2 and 4 are allowed. The prior art applied above, cited below, or cited by applicants, does not disclose the use of two or more on/off valves to control the flow of reactants within a fuel cell system, to provide preset flows. Claim 3 would likewise be allowable if its above-mentioned informality is corrected.

Claims 12-15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The parallel shutoff valves in the reactant supply systems within a hydrogen-producing device are not disclosed by the prior art.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fronk (US 6,497,970), Ogawa *et al.* (US 6,586,126) and Hara *et al.* (US 5,648,182) disclose fuel cells with hydrogen producing devices with controlled valves.

The disclosure is objected to because of the following informalities: Drawing numeral 11b, in figure 1, is not mentioned in the specification. In figure 9, there are two different parts denoted by the numeral 5. Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 703-308-0433. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 703-308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

sjk